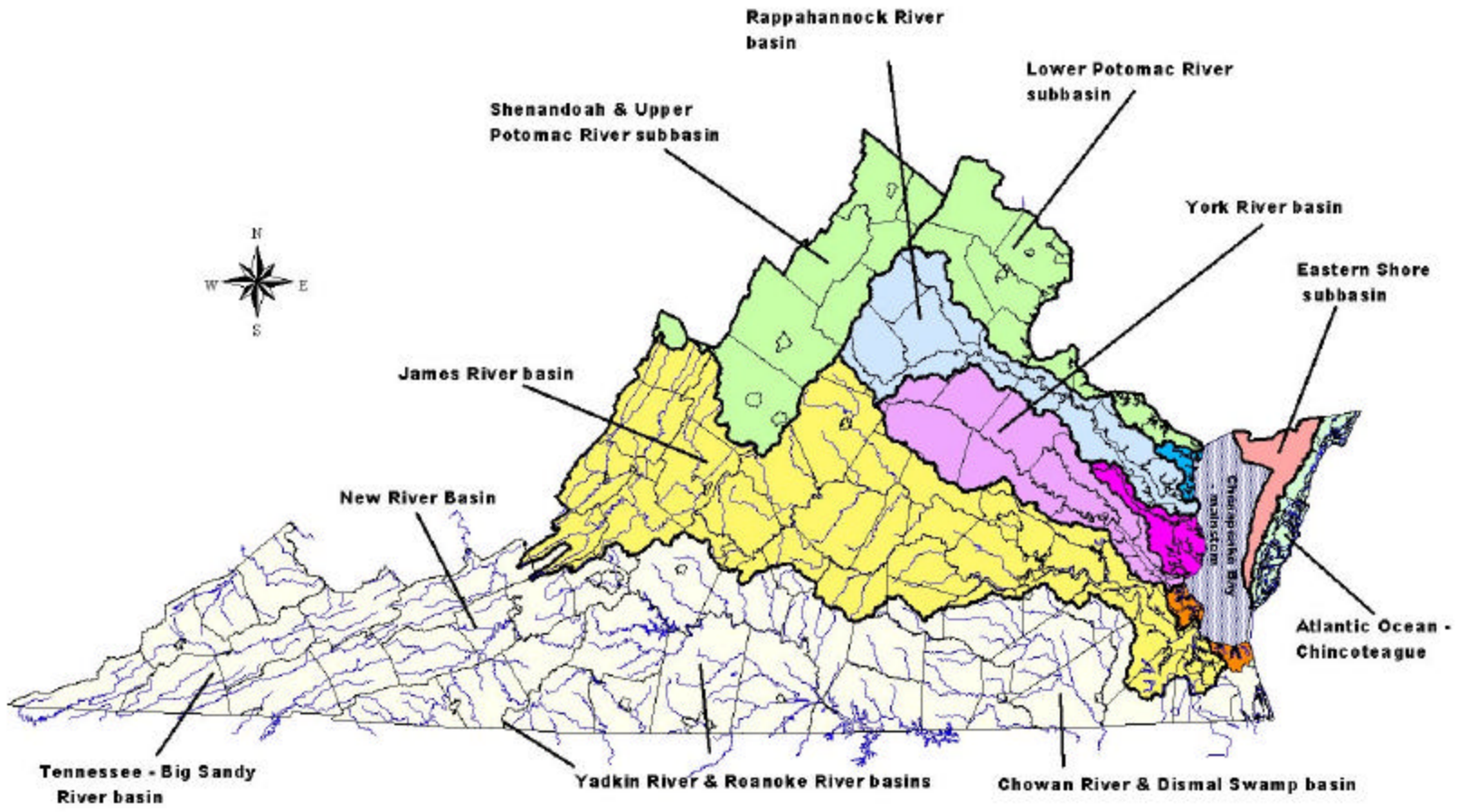
Proposed Regulations: Point Source Nutrient Discharge Limitations in the Chesapeake Bay Watershed

Virginia Tributary Strategy River Basins



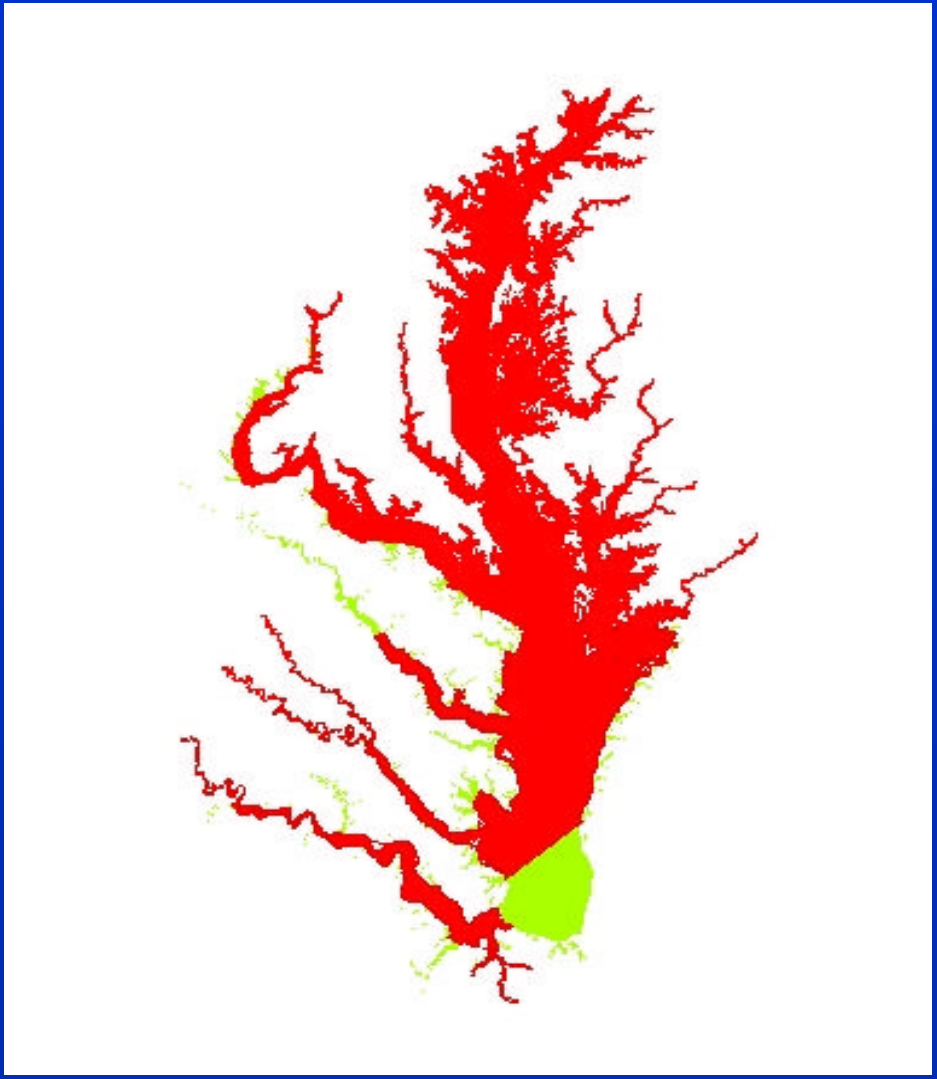
Impaired Chesapeake Bay

Major portions of the Chesapeake Bay and its tidal rivers are listed under the Clean Water Act as "impaired waters", due to one or more of the following problems related to nutrient over-enrichment:

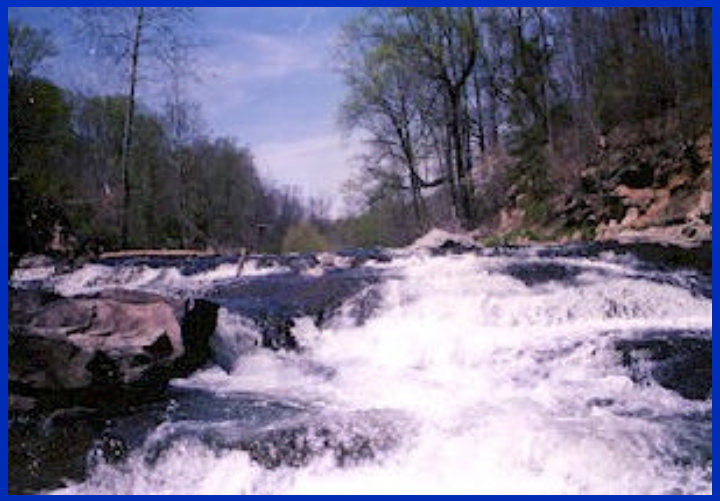
→ low dissolved oxygen levels

→ poor water clarity

→algae bloom conditions and poor quality fish food



Chesapeake 2000: A Watershed Partnership



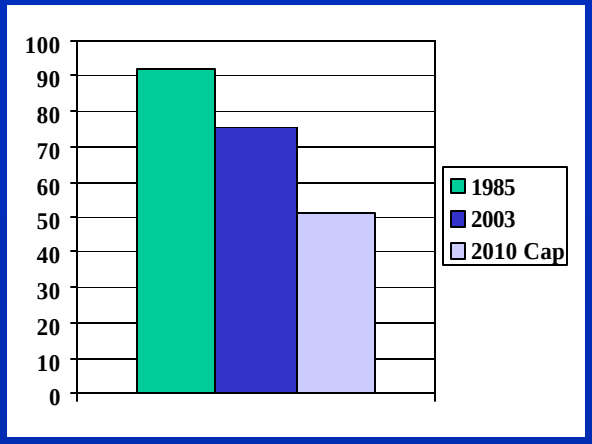
- "By 2010, correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act."

Restored Water Quality Means:

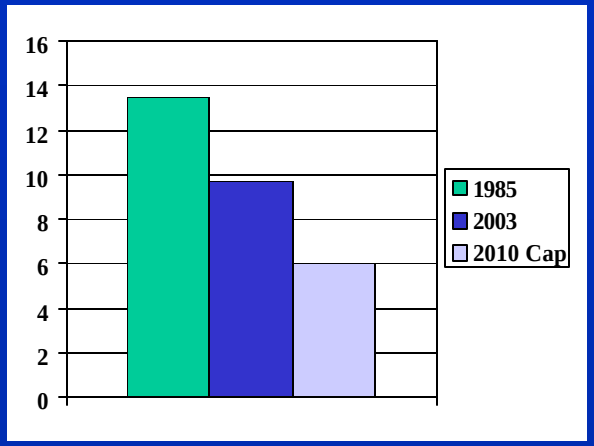
- Overall better balance of aquatic life
- More oxygen and improved habitat for more fish, crabs and oysters
- Clearer water and more underwater Bay grasses
- Fewer algae blooms and better fish food

To Achieve New Water Quality Standards, Nutrient and Sediment Loads throughout Watershed Need to be Reduced

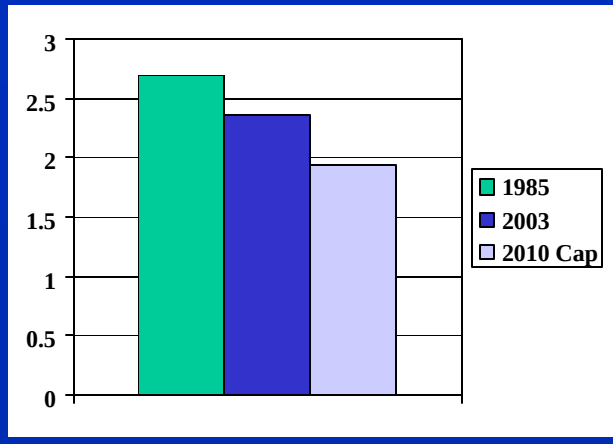
Nitrogen Loads
[M lbs/yr]



Phosphorus Loads
[M lbs/yr]



Sediment Loads
[M tons/yr]



Steps to Chesapeake Bay Restoration – Point Sources

- **Water Quality Criteria** - published by EPA in 2003
- **Load Allocations** - for nitrogen, phosphorus and sediment assigned to river basins by CBP in 2003
- **Tributary Strategies** – being finalized for 5 VA Bay basins
- **VA Water Quality Standards** –SWCB approved 5 new designated uses, and dissolved oxygen, clarity, and chlorophyll (narrative) criteria on 3/15/05.
- **Point Source regulations** – proposals to set nutrient removal technology and load allocations now undergoing public review and comment 2/21/05 – 4/25/05
- **Permit Limits** - now and after regulations adopted
- **Technical and Financial Assistance** - WQIF and RLF

Proposed Point Source Regulations

1. **Regulation for Nutrient Dischargers** ***(9 VAC 25-40)***
   - **sets technology-based nutrient concentration limits for certain discharges**
2. **Water Quality Planning Regulation** ***(9 VAC 25-720)***
   - **allocates nutrient loads for significant discharges within each river basin as identified through Tributary Strategies**
   - **establishes trading and offsets program**

Regulation For Nutrient Enriched Waters and Dischargers Within the Chesapeake Bay Watershed

(9 VAC 25-40)

Overview
(9 VAC 25-40)

- For wastewater treatment plants, proposed changes will:
  - Specify technology-based, annual average concentration limits for nitrogen and phosphorus
  - Set limits and deadlines, which vary based on:
    - size of treatment plant
    - existing vs. new or expanded dischargers
  - Allow for alternative limits if discharger can demonstrate that specified levels cannot be achieved

Summary Of Amendments (9 VAC 25-40)

TYPE OF DISCHARGER	NUTRIENT CONCENTRATION LIMITS [annual average]	SCHEDULE
Existing Significant Dischargers	TN = 8.0 mg/l TP = 1.0 mg/l	Within 4 years of next permit reissuance; but no later than Dec. 31, 2010
Existing Non-Significant Dischargers [>40,000 gpd]	TN = 8.0 mg/l TP = 1.0 mg/l	Within 4 years following first permit reissuance after Dec. 31, 2010
All New or Expanded Dischargers [>40,000 gpd]	TN = 3.0 mg/l TP = 0.3 mg/l	Upon discharge
All Existing or New Dischargers	Alternative Limits allowed, if shown that above limits cannot be achieved	Applicable schedule

Proposed Revisions to Water Quality Management Planning Regulation

(9 VAC 25-720)

Overview
(9 VAC 25-720)

For wastewater treatment plants, proposed changes will:

- **Establish annual point source nitrogen and phosphorus waste load allocations in each of VA's Chesapeake Bay tributary basins - based on *Tributary Strategies***
- **Authorize use of a watershed trading and offset program to assist in the nutrient reduction effort**

Determining Waste Load Allocations (9 VAC 25-720)

- **Design Flow: "Discharge flow authorized by VPDES permit and/or the capacity that wastewater treatment processes will likely be operating, per CTO, in the year 2010." (Tributary Strategy document, pg. 55)**

- **SNR's August 27, 2004 Policy Statement:**
  - **Achieve nutrient reductions necessary to restore Chesapeake Bay and its tidal tributaries in the timeframe set by *Chesapeake 2000 Agreement*;**
  - **Provide for full use of existing design capacity at each of the significant municipal and industrial wastewater treatment plants; and,**
  - **Apply currently available, stringent nutrient reduction technologies at these treatment plants.**

Determining Waste Load Allocations (continued)

- **Concentrations used as Basis for Allocations by River Basin *(per SNR's 8/04 Policy Statement)*:**
  - **Shen.-Potomac (AFL) / Rapp. / Eastern Shore**
    - **TN = 4.0 mg/l and TP = 0.3 mg/l**
  - **Potomac (BFL)**
    - **TN = 3.0 mg/l and TP = 0.3 mg/l**
  - **York/James**
    - **allocations in proposed WQMP Regulation are interim, and will be finalized after water quality standards are adopted**

Water Quality Mgmt. Planning Regulation (9 VAC 25-720)

- Establishes **Trading** and **Offsets** program
  - enhance cost-effectiveness of achieving and maintaining waste load allocations in each basin
  - allow for new and expanded treatment plants in the future – provides for growth under loading cap
  - designed for specific circumstances of Chesapeake Bay watershed

Water Quality Mgmt. Planning Regulation (9 VAC 25-720)

- **Trading** - point sources allowed to transfer nitrogen or phosphorus waste load allocations with each other to maintain or achieve basin nutrient load allocations
- **Offsets** - an option allowed only for new or expanded dischargers to use BMPs to offset the extra nutrient load discharged from the point source

Relationship between two Regulations

Example 1:

Significant discharger with capacity of 10 MGD

Permit limits as follows:

1. Concentration of TN = 8 mg/l

2. Load allocation of 120,000 pounds/year of nitrogen

- **4.5 MGD x 8.0 mg/l x CF = 110,000 pounds/year**
- **6.5 MGD x 6.0 mg/l x CF = 120,000 pounds/year**
- **10 MGD x 4.0 mg/l x CF = 120,000 pounds/year**

Relationship between two Regulations

Example 2:

Same discharger expands to capacity of 20 MGD

Permit limits as follows:

1. **Concentration of TN = 3 mg/l now applies**
2. **Load allocation of 120,000 pounds/year of nitrogen remains the same**

- **12 MGD x 3.0 mg/l x CF = 110,000 pounds/year**
- **13 MGD x 3.0 mg/l x CF = 120,000 pounds/year**
- **15 MGD x 3.0 mg/l x CF = *140,000* pounds/year**
  - ***needs to trade or offset for 20,000 pounds/year***
- **20 MGD x 3.0 mg/l x CF = *180,000* pounds/year**
  - ***needs to trade or offset for 60,000 pounds/year***

Cost Estimates*

Capital cost estimates for significant dischargers to meet concentration and waste load allocation limits:

Basin	Nitrogen Control Cost (million $)	Phosphorus Control Cost (million $)	Total Nutrient Control Cost (million $)
Shen-Potomac	$457	$13	$470
Rappahannock	$91	$1	$92
York	$29	<$1	$30
James	$480	$6	$486
Eastern Shore	$13	<$1	$14
TOTALS	***$1,071***	***$21***	***$1,092***

NOTE:** ***figures are planning level, order-of-magnitude cost opinions, accurate from -30% to +50%

Public Comment Opportunities

- SWCB approval for public review: August 2004
- Public comment period: Feb 21 – Apr 25
- Present to Board for final action: Fall 2005

- See DEQ Chesapeake Bay Program webpage at this link:

  http://www.deq.virginia.gov/bay/multi.html

2005 General Assembly:

Nutrient Credit Exchange Legislation

(HB 2862 / SB 1275)

- **SWCB to draft "Watershed General Permit" containing waste load allocations (WLA) for each facility**
- **Allows trading within basins among facilities covered by WG Permit**
- **Authorizes establishment of "Nutrient Credit Exchange Association"**
- **Impacts on dischargers vary by size, location, existing vs. expanding vs. new - - matrix of possibilities shown on following slides - - proposed regulations need to conform with very complex new law**

Control Requirements Summary

Ches. Bay Watershed Nutrient Credit Exchange Program

(HB 2862; SB 1275)

"Non-Significant" Dischargers:

Plant Size (MGD) and Location	Existing Plant No Expansion	Existing Plant Expanding to. . .	New Plant
< 0.1 anywhere	- No registration - Permit by Rule - Tech. limits based on system installed, only if upgrade w/o expansion - No W.L.A. - No trading	- Expansion to 0.04 or more - Register - Tech. limits based on system installed - No W.L.A. - Offset loads above permit capacity	- 0.04 or more - Register - BNR (TN = 8 mg/l; TP = 1 mg/l) - No W.L.A. - Offset entire load
0.1 to < 0.5 non-tidal tributaries	- No registration - Permit by Rule - Tech. limits based on system installed, only if upgrade w/o expansion - No W.L.A. - No trading	- Register - BNR (TN = 8 mg/l; TP = 1 mg/l) - No W.L.A. - Offset loads above permit capacity	- Register - BNR (TN = 8 mg/l; TP = 1 mg/l) - No W.L.A. - Offset entire load

Control Requirements Summary

Ches. Bay Watershed Nutrient Credit Exchange Program

(HB 2862; SB 1275)

"Significant" Dischargers:

Plant Size (MGD) and Location	Existing Plant No Expansion	Existing Plant Expanding to. . .	New Plant
0.1 to < 0.5 tidal tributaries	- Register - Tech. limits based on system installed, only if upgrade w/o expansion - W.L.A. - Trading allowed	- Register - State-of-the-art treatment (TN = 3 mg/l; TP = 0.3 mg/l) - W.L.A. - Offset loads above W.L.A. - Trading allowed	- Register - State-of-the-art treatment (TN = 3 mg/l; TP = 0.3 mg/l) - No W.L.A. - Offset entire load
= to or >0.5 anywhere	- Register - Tech. limits based on system installed, only if upgrade w/o expansion - W.L.A. - Trading allowed	- Register - State-of-the-art treatment (TN = 3 mg/l; TP = 0.3 mg/l) - W.L.A. - Offset loads above W.L.A. - Trading allowed	- Register - State-of-the-art treatment (TN = 3 mg/l; TP = 0.3 mg/l) - No W.L.A. - Offset entire load

2005 General Assembly:
Nutrient Credit Exchange Legislation
Trading Provisions

- **Dischargers' compliance plan may include exchange of point source credits to achieve waste load allocations in accordance with General Permit**
- **New or expanded facilities may acquire needed allocations from:**
  - **other permitted facilities**
  - **non-point source BMPs**
  - **payment into Water Quality Improvement Fund**

2005 General Assembly:
Nutrient Credit Exchange Legislation
Trading Provisions

- **Options for compliance with individual waste load allocations:**
  1. **Mass load discharged less than waste load allocation**
  2. **Acquire sufficient point source credits**
  3. **If unable to meet waste load allocations by #1 or #2, acquire sufficient waste load allocations by payment into the Water Quality Improvement Fund**

Submission of Public Comments

- By 5 PM, April 25, 2005, send to:
  - Department of Environmental Quality, P.O. Box 10009, Richmond, VA 23240, Attn: John Kennedy
  - Fax: 804-698-4116
  - E-Mail: jmkennedy@deq.virginia.gov